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(54) Abstract Title
Selective (goods) storage access

(57) A variable code (3) is communicated to a remote party (S, LM) for use in gaining access to a storage unit (SU). The code (3) may have a limited validity period and be generated for each transaction requiring access to the storage unit, such as an order (1) for delivery or collection of goods. The storage unit (SU) has an input device and is unlocked if an entered code matches an access code. The access code is received by means of a communications terminal integrated with the storage unit (SU), or the entered code is transmitted and an unlock command is received by means of the communications terminal. The storage unit (SU) may be connected to a further storage unit such that a code entered at the storage unit may be used to unlock the further storage unit. The storage unit (SU) may contain a pivotable, latchable and lockable partition controlled so as to prevent a second delivery man stealing goods left by a first delivery man.

Fig. 1

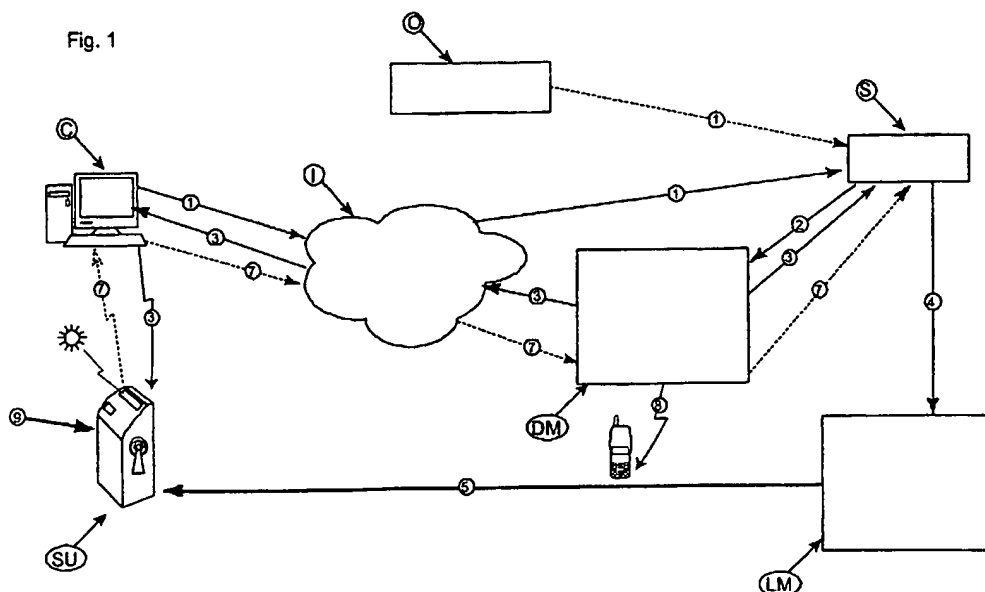


Fig. 1

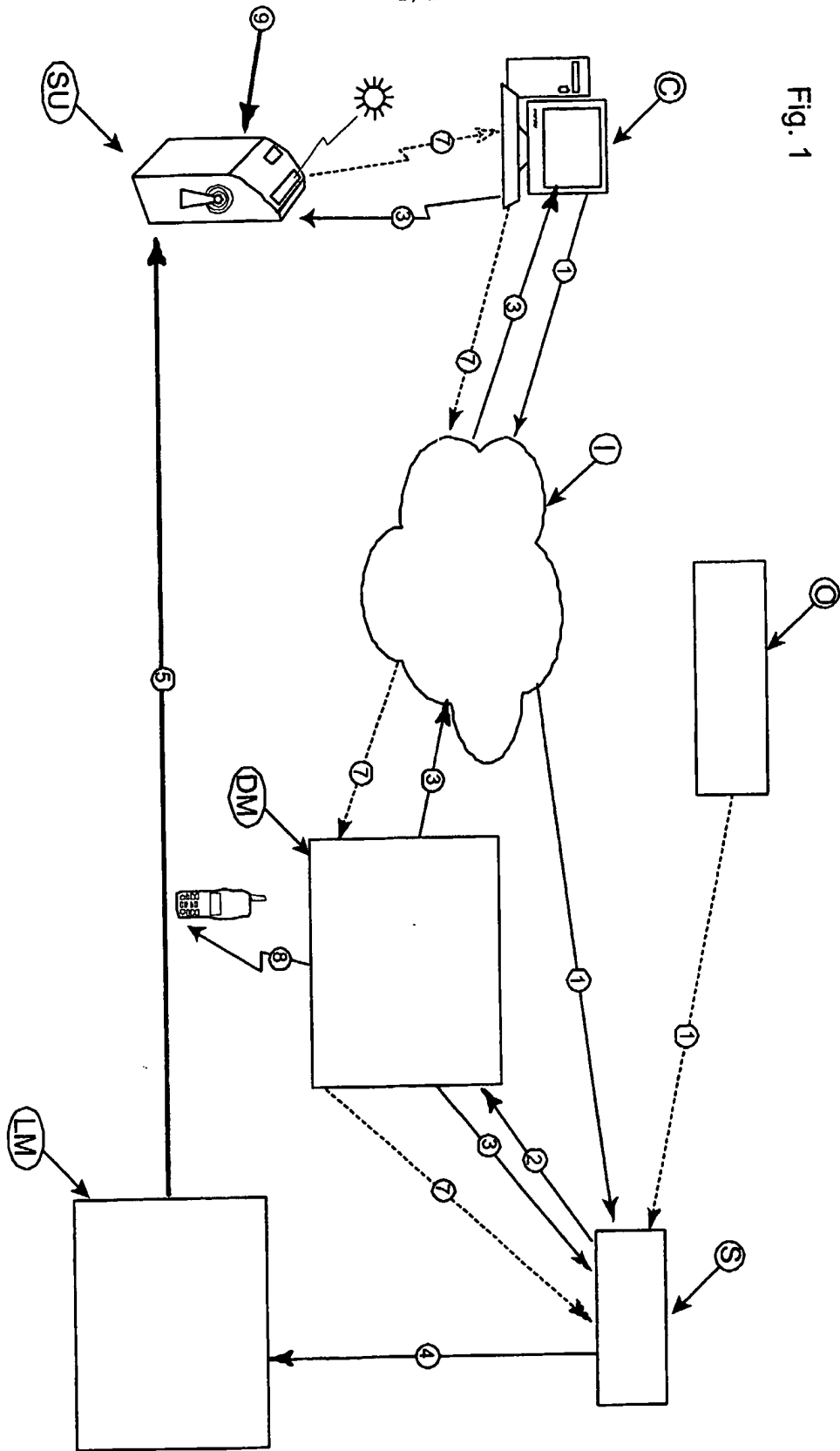


Fig. 2

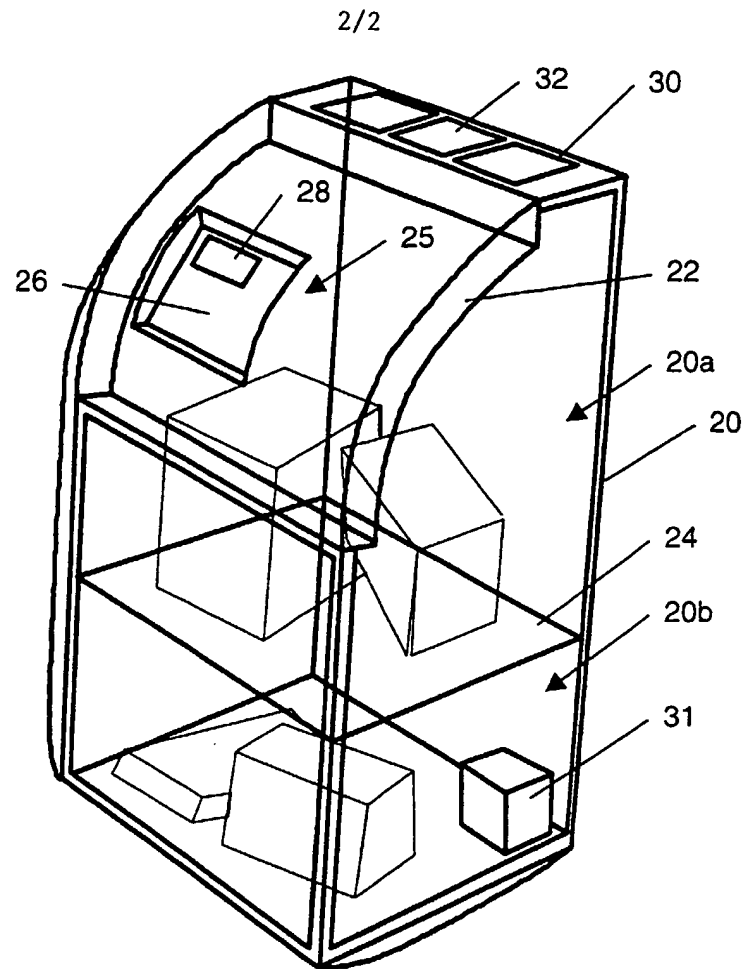


Fig. 3

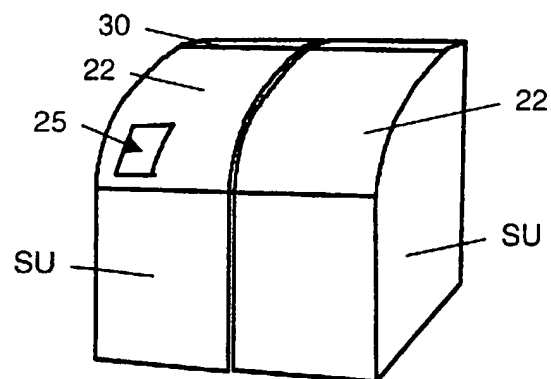
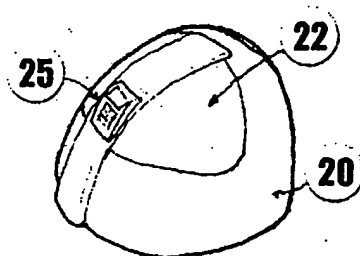


Fig. 4



Selective Storage Access Apparatus, Method and System

The present invention relates to a method, system and apparatus for selectively enabling delivery or collection of items to or from a storage unit
5 under electronic control.

The increasing popularity of the Internet for ordering items has lead to a parallel increase in the use of delivery services, such as post and courier. Frequently, the items are too large to be delivered through a conventional letterbox or require proof of receipt, so that a person must be present to
10 receive them, or must collect them from a depot. Moreover, the user must take the item to a post office if it needs to be returned. Hence, delivery and collection are often inconvenient, which hinders user acceptance of on-line ordering.

The document US 6010064 discloses a set of lockers allowing
15 customers to drop off exposed film and collect developed prints. Users enter a PIN when depositing film and use the same PIN to collect their prints.

The document US 5946660 discloses a self-storage system allowing internet-based rental of storage units. The user is given an access code for a security gate providing access to the storage facility within which the units are
20 located.

According to one aspect of the present invention, there is provided an access code distribution method and system, in which an access code is accessible to a storage unit and is also communicated to a remote party. The remote party then uses the access code to gain access to the storage unit. The
25 access code is variable and may be generated for each transaction requiring access to the storage unit. The transaction may be an order for delivery of goods to, or collection of goods from, the storage unit. The access code may have an associated validity period, so that access may only be gained using the access code during the validity period.

According to another aspect of the present invention, there is provided a storage unit having an input device and an electronically actuable lock which is unlocked so as to enable access to the storage unit if a code entered by means of the input device matches an access code. In one more specific aspect, the access code is received by means of a communications terminal, which may be a wireless terminal. In another more specific aspect, the entered code is transmitted and an unlock command is received by means of a communications terminal, which may be a wireless terminal. In another more specific aspect, the storage unit may be connected to a further storage unit such that a code entered at the storage unit may be used to unlock the further storage unit.

According to another aspect of the present invention, there is provided a storage unit which is internally divided after a first access so that part of the storage unit is inaccessible during a second access to the storage unit.

Specific embodiments of the present invention will now be described with reference to the accompanying drawings, in which:

Figure 1 is a schematic diagram of a delivery and/or collection system in one embodiment of the present invention;

Figure 2 is a perspective transparent diagram of a storage unit for use in the system of Figure 1;

Figure 3 is a perspective simplified diagram of the storage unit of Figure 2 connected to another storage unit; and

Figure 4 is a perspective diagram of an alternative storage unit to that shown in Figure 2.

As shown in Figure 1, a system in an embodiment of the present invention comprises a storage unit SU unlockable under electronic control. As shown in more detail in Figure 2, the storage unit comprises a robust housing closable by a hinged lid 22, which is normally locked when shut, for example by means of a spring-loaded bolt which is moved against the spring bias by a solenoid and is held in this position when the lid is open by a surface

movable with the lid 22. Mounted on the outer face of the lid 22 is a control panel 25 comprising a keypad 26 and a display 28, such as an LCD or LED display. The control panel 25 may be protected from the environment by a hinged clear plastic flap (not shown). The control panel 25 is connected to an electronic controller 30, to which power is supplied by a primary power source 31, such as a mains transformer or a battery, and optionally by a secondary power source, such as solar panels 32. The controller 30 is connected to an electronic actuator so as to actuate unlocking of the lid 22, to a sensor arranged to detect whether the lid 22 is open and to wireless terminal equipment, such as a Bluetooth™ slave device.

As shown in Figure 1, the storage unit SU is in wireless communication with a computer C, which includes wireless base station equipment such as a Bluetooth™ master device. The computer may be a standard PC-compatible or Macintosh™ computer and includes means for connection to the Internet, such as a modem, ISDN terminal adapter or ADSL interface. The computer C stores and executes software for internet and world wide web access, such as Windows™ Dial-up Networking and Microsoft™ Internet Explorer™ or Netscape Navigator™.

A user of the computer C accesses the website of a supplier S, implemented on a suitably programmed server, and transmits an order message 1 for one or more items for delivery. As part of the order message, a delivery address and payment details are provided by the user; these may have been entered previously as part of a registration procedure with the supplier S. Alternatively, as shown by a dotted line in Figure 1, the order message 1 may be sent offline, for example by a telephone call or via another data terminal O.

When the order has been processed and the items are ready for delivery, the supplier S sends a PIN request message 2 to a delivery management system DM. The delivery management system DM may comprise a suitably programmed server connected via the Internet or other network to servers hosting websites operated by many different suppliers S.

The PIN request message 2 specifies an IP or e-mail address for the computer C and preferably a unique transaction identification code, to facilitate reconciliation of messages relating to that transaction. The PIN request message 2 also specifies a delivery date or time range for the item or items
5 ordered by the user.

In response to the PIN request message 2, the delivery management system DM transmits a PIN message 3 to the supplier S and to the computer C. The PIN message 3 specifies a PIN and, in the transmission to the computer C, the delivery date or time specified in the PIN request message 2.
10 Preferably, the PIN message 3 includes the unique transaction identification code. The computer C transmits the PIN message 3 to the storage unit SU where it is stored in a memory store of the controller 30.

As an alternative, the user may specify the PIN and the PIN message 3 may then be transmitted from the computer C to the delivery management
15 system DM and thence to the supplier S and logistics management system LM. The delivery details may be sent to the computer C in a separate message from the PIN message 3 and may even be sent directly from the supplier S to the computer C. Where the user specifies the PIN, the delivery management system may be dispensed with altogether and the PIN message transmitted
20 directly from the computer to the supplier S. However, it is preferable that the delivery details and PIN are stored by a party, such as the logistics management system LM, that is distinct and separate from the supplier S, so as to assist in resolving any disputes between customers and suppliers.

The supplier S also transmits a delivery details message 4, including
25 the PIN and delivery details, to a carrier logistics management system LM, which may comprise a server connected via the Internet I to the supplier's server or may be integrated with the supplier's server. The PIN and delivery details are transferred to delivery personnel who collect the ordered items and deliver them to the storage unit SU. The PIN and delivery details may be
30 printed on a delivery form or downloaded to a portable electronic device such

as a PDA for use by the delivery personnel. Alternatively, the PIN may be recorded in a card, such as a magnetic strip or smart card, and the card read by a card reader integrated with the control panel 25. The card may also store a user PIN, which the deliverer must enter correctly to verify authorisation to use the card.

The delivery personnel then deliver the ordered items 5 to the storage unit SU and enter the PIN from the delivery details message 4 on the keypad 26. The controller 30 compares the entered PIN with one or more PINs recorded from previously received PIN messages 3. If the entered PIN matches one of the previously received PIN messages and the current date or time matches the date or time range specified in that PIN message 3, the controller 30 unlocks the lid 22 to allow the items to be deposited in the storage unit SU. Otherwise, the lid 22 is not unlocked and the deliverer is prompted via the display 28 to re-enter the PIN. If no match is found after a predetermined number of tries, the controller 30 suspends PIN entry for a predetermined time and transmits a message to the computer C reporting an unsuccessful attempt to gain access to the storage unit SU.

Once the lid 22 has been opened and subsequently closed, the storage unit SU transmits a delivery confirmation message 7 to the computer C, which forwards the confirmation message 7 to the delivery management system DM, which forwards the delivery confirmation message 7 to the supplier S. The delivery confirmation message 7 may include a delivery code which is generated by the controller 30 and is also displayed on the display 28. The delivery code may be generated as a function of various details of the delivery, such as the actual time of delivery or the PIN, or may be generated randomly. The delivery code may be recorded by the delivery personnel and stored in the logistics management system LM as proof of delivery. The delivery confirmation message 7 preferably also includes the unique transaction identifier associated with the PIN in the PIN message 3.

Once the lid 22 has been opened and subsequently closed, the controller 30 deletes or flags as inactive the PIN message containing the PIN which has just been used, so as to prevent the PIN from being reused within its time validity to remove the delivered items.

- 5 Optionally, in response to the delivery confirmation message 7, the delivery management system DM transmits a short message, for example via the GSM SMS, so as to notify the recipient of the delivery of the item.

The recipient subsequently unlocks the lid 22, by keying in a master PIN, and collects the delivered items.

- 10 The storage unit SU may also be used for collection of returned items, in essentially the same way as described above, except that the user accesses the supplier's website to arrange return rather than delivery of one or more items. If the return is authorised, the PIN is generated as before. The possessor of the goods unlocks the lid 22 using the master PIN and stores the items
15 inside. The delivery personnel then visit the storage unit to collect the items, using the PIN to open the storage unit SU, instead of depositing items in the storage unit SU.

- Further preferred or alternative features of the storage unit SU will now be described with reference to Figures 2 to 4. As shown in Figure 2, the
20 housing 20 may contain a hinged flap 24 which can be moved between a horizontal position, as shown in Figure 2, in which the housing 20 is internally divided into an upper compartment 20a and a lower compartment 20b, and a substantially vertical position against the back wall of the housing 20, as indicated by the dashed arrow, in which the housing 20 is not internally
25 divided.

- A latch controlled electronically by the controller 30 can releasably latch the hinged flap 24 in the substantially vertical position, while a lock controlled electronically by the controller 30 releasably locks the hinged flap in the substantially horizontal position. When collecting delivered items, the
30 recipient removes any items from the upper compartment 20a, lifts the hinged

flap 24, which is unlocked in response to entry of the master PIN, and latches it in the substantially vertical position. When a first subsequent delivery is made and the lid 22 is closed, the controller 30 releases the latch and allows the hinged flap 24 to pivot under gravity to the substantially horizontal position, where it is locked. When a second delivery is made, the delivered items are placed in the upper compartment 20a and the lower compartment 20b cannot be accessed. This feature allows two deliveries to be made before collection by the recipient, without compromising the security of the first delivery. As an alternative, there may be attached to the inner surface of the lid 22 an open bin such as used in night deposit boxes in banks. The items are placed in the bin and drop down into a storage compartment when the lid 22 is closed. The storage compartment is inaccessible when the lid 22 is open.

The embodiment shown in Figure 2 can be secured to a wall by means of bolts fixed through the back wall of the housing 20, or to a solid base by means of bolts fixed through the floor of the housing 20. Alternatively, the storage unit SU may be built into an external wall of a building, and may be accessed for collection of deposited items from within the building, by means of an access door different from the lid and lockable from within the building. The housing 20 is preferably constructed of steel, reinforced plastic or other strong material so as prevent breaking in. The housing 20 may be coated with a decorative finish and may carry a logo and/or advertising on the outer surface.

In a first variant, the housing 20 may be thermally insulated so as to prevent extreme temperature variation. The housing 20 may include a refrigeration unit to allow storage of perishable items in a refrigerated or freezer compartment thereof.

As an additional feature of the embodiment of Figure 2, the storage unit SU may include a bus connector to which further storage units SU may be daisy chained, as shown in Figure 3. The further units each contain a slave controller, connected to a lock actuator and a lid sensor, controllable by the

controller 30 so as to allow unlocking of their lid and detection of the lid being open. The further units do not require a separate control panel 25 or wireless terminal and may draw power via the bus connector. The controller 30 may selectively open one of the storage units SU if the entered PIN matches a delivery order and another one of the storage units SU if the entered PIN matches a collection order. Alternatively or additionally, the controller 30 may selectively open the storage units SU in turn as the previous one has received a delivery (or two deliveries in the embodiment shown in Figure 2) or dispensed a collection.

10 An alternative embodiment to the storage unit SU of Figure 2 is shown in Figure 4. This embodiment is simplified in that it does not include the feature of the internal hinged flap 24, is circular in cross section and is compact so as to be of suitable size to receive small packages such as books and CDs which are typically ordered over the Internet.

15 In a further alternative embodiment, some or all of the functions of the computer C are integrated within the storage unit SU and the wireless interface of the storage unit SU is replaced by a network interface to the internet I, either via a wireline connection or a wide area wireless network, such as a terrestrial cellular (e.g. GSM, GPRS) or satellite network. In this way, the PIN notification message 3 may be transmitted directly from the delivery management system DM to the storage unit SU rather than via the computer C. Likewise, the delivery notification message 6 may be transmitted directly to the delivery management system DM rather than via the computer C. This removes a possible requirement that the computer C be always on and connected to the Internet I, or at least be connected thereto to enable messages to pass to and from the storage unit SU.

Conversely, in an alternative embodiment some of the functions of the storage unit SU described above may instead be performed by the computer C. For example, it is not necessary that the storage unit SU store PIN messages; instead, entered PINs may be transmitted to the computer C where they are

30

checked against stored PIN messages and an unlock command is transmitted back to the storage unit SU only if the entered PIN is valid.

Although in the above embodiment the Internet is used for some of the data transmissions, the present invention is not limited to the use of the Internet, but any suitable packet or circuit switched network may be used, and a different or the same network may be used for communication between each pair of parties. Local area communications, such as between the computer C and the storage unit SU and possibly between the supplier S and the logistics management system LM, do not require any switchable network but may use a dedicated link.

CLAIMS

1. A method of selectively enabling access to a storage unit, comprising:
transmitting a first access code to a remote terminal;
locally receiving a second access code; and not enabling access to the
5 storage unit unless the second access code matches the first access
code.
2. A method of selectively enabling access to a storage unit, comprising:
receiving a first access code from a remote terminal;
locally receiving a second access code; and not enabling access to the
10 storage unit unless the second access code matches the first access
code.
3. A method as claimed in claim 1 or claim 2, including storing a time
validity criterion relating to the first access code, wherein access to the
storage unit is not enabled unless the time of receipt of the second
15 access code matches the time validity criterion.
4. A method according to any preceding claim, including if access to the
storage unit is enabled, outputting a variable acknowledgement code.
5. A method as claimed in any preceding claim, including conducting an
electronic transaction for delivery of one or more items to the storage
20 unit.
6. A method as claimed in claim 5, including storing said one or more
items in the storage unit if access thereto is enabled.
7. A method as claimed in any one of claims 1 to 4, including conducting
an electronic transaction for collection of one or more items from the
25 storage unit.
8. A method as claimed in claim 7, including collecting said one or more
items from the storage unit if access thereto is enabled.
9. A method as claimed in any preceding claim, including, if access to
the storage unit is enabled, initiating transmission of a notification
30 message to said remote terminal.

10. A method of selectively enabling access to any one of a plurality of storage units, comprising:
receiving an access code request from a first network node; and
transmitting an access code to the first network node; wherein the
5 access code enables access to at least one of said plurality of storage units.
11. A method as claimed in claim 10, including generating said access code.
12. A method as claimed in claim 11, including transmitting said access
10 code to a terminal different from said first network node.
13. A method as claimed in claim 10, including receiving said access code from a terminal different from said first network node.
14. A method as claimed in any one of claims 10 to 13, including
15 receiving a unique transaction identifier from the first network node, associated with the access code request.
15. A method as claimed in claim 14, wherein the unique transaction identifier identifies an electronic delivery or collection transaction relating to said at least one of said plurality of storage units.
16. A method as claimed in any one of claims 10 to 15, including
20 receiving an access confirmation message confirming access to said at least one of said plurality of storage units.
17. A method as claimed in claim 16 when dependent on claim 14, wherein said access confirmation message includes said unique transaction identifier.
- 25 18. A method as claimed in claim 16, wherein said access confirmation message includes said access code.
19. Apparatus arranged to perform a method as claimed in any preceding claim.
20. A computer program arranged to perform a method as claimed in any
30 preceding claim when executed by suitably arranged hardware.

21. A storage unit having an input device, a wireless terminal and a lock electronically controllable in dependence on a signal received by the wireless terminal and a code entered by means of the input device.
22. A storage unit according to claim 21, wherein the signal includes an
5 access code, wherein the lock is arranged not to be unlocked unless the entered code matches the access code.
23. A storage unit as claimed in claim 22, wherein the signal includes a time criterion value and the lock is arranged not to be unlocked unless the time of entry of said code matches the time criterion value.
- 10 24. A storage unit as claimed in claim 21, wherein the wireless terminal is arranged to transmit the entered code, and the lock is arranged to be unlocked in response to an unlocking command in said received signal.
25. A storage unit having an input device, a communications terminal and
15 a lock electronically controllable so as not to be unlocked unless a code entered by means of the input device matches an access code received by the communications terminal.
26. A storage unit as claimed in claim 25, wherein the lock is arranged not to be unlocked unless the time of entry of said code matches a time
20 criterion value received by the communications terminal.
27. A storage unit having an access door and a partition moveable between a first position in which a first part of the storage unit is accessible through the access door and a second position in which a second part
25 of the storage unit is accessible through the access door while the partition prevents access to said first part through said door, the storage unit further comprising a lock arranged to lock the partition in said second position in response to the access door being opened and subsequently closed.

28. A storage unit as claimed in claim 27, wherein said second part of the storage unit is accessible through the access door when the partition is in said first position.
29. A storage unit having an input device, a store and a lock electronically
5 controllable so as not to be unlocked unless a code entered by means of the input device matches an access code stored in said store, the storage unit further including a connector for connection to at least one further storage unit, such that the at least one further storage unit cannot be unlocked unless a further code entered by means of the input
10 device matches a further access code stored in said store.
30. Apparatus comprising at least first and second storage units, the first storage unit having an input device, a store and a first lock electronically controllable so as not to be unlocked unless a first code entered by means of the input device matches a first access code stored
15 in said store, the second storage unit being connected to the first storage unit and having a second lock arranged not to be unlocked unless a second code entered by means of the input device matches a second access code stored in said store.
31. A method substantially as herein described with reference to Figure 1
20 of the accompanying drawings.
32. A storage unit substantially as herein described with reference to Figure 2 of the accompanying drawings.
33. A storage unit as claimed in claim 32, further substantially as herein described with reference to Figure 3 of the accompanying drawings.
- 25 34. A storage unit substantially as herein described with reference to Figure 4 of the accompanying drawings



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Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): G4H (HTG)

Int Cl (Ed.7): G07C, G07F, A47G

Other:

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2344670 A (IBM) eg abstract	1,2,25 at least
X	GB 2302976 A (WHITE) whole document	"
X	WO 97/41542 A1 (PORTER) whole document	"
X	US 5624071 (SOSAN) eg abstract, and column 2 line 50 to column 5 line 29	"
X	US 4894717 (KOMEI) eg abstract, and column 1 line 58 to column 2 line 63	"

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